UNIVERSITY OF OREGON

Ecosystem Workforce Program

BRIEFING PAPER #19

Defining Woody Biomass Uses

Shiloh Sundstrom **Fall 2009**

Woody Biomass Uses – focused on utilization of residuals from hazardous fuels reduction, forest restoration, commercial timber harvest, forest products manufacturing, and plantation management.

Energy Uses

1. Firewood – wood used for fuel that is cut into lengths, split, dried usually sold by the cord or in small bundles for residential heating or campfires.[1]

2. BioBricks - wood fuel bricks that are created by compressing sawdust and wood chips. Bricks are burned in existing wood stoves, fireplaces, and campfires.[2]

3. Bagged/Bulked Pellets - pelletized wood fuel made from residual wood processing products including small trees, limbs, sawdust, and peelings that is burned in specially designed residential stoves and industrial boilers.[3]

4. Electricity – Electricity that is generated when woody biomass is burned to heat water and create steam to power a turbine. Electricity can be used on-site for industrial applications or sold to a local utility.[4]

5. Cogeneration or Combined Heat and Power (CHP) – a process where the heat produced by the generation of electricity is captured and put to use. This can occur at residential or industrial scales where the heat is typically used on site for industrial purposes like drying lumber and electricity is used on site or sold to a local utility.[5]

6. District Heat – Heating systems that produce heat in a central location (i.e. a wood fired boiler) and then distribute hot water or steam throughout a building or buildings.[6]

7. Charcoal - cooking fuel that is created by the partial burning of wood by heating the wood in the absence of oxygen. Charcoal burns long, hot, and sturdy with less smoke then wood, making it useful for outside cooking. Charcoal comes in a variety of forms including lump charcoal and briquettes.[7]

8. Cellulosic Ethanol – A liquid fuel that is created by chemical process that converts plant material including woody biomass into sugars. These sugars are fermented to make ethanol which can be combined with or replace petroleum. While cellulosic ethanol production is an emerging technology there is an existing market for ethanol.[8]

9. Gasification and Pyrolysis– The thermal decomposition of woody biomass with little or no oxygen into a variety of products including biochar that can be used as a soil amendment, and bio-oil and gases including methane, hydrogen, carbon monoxide, and carbon dioxide that can be used to create various forms of renewable energy. Pyrolysis and gasification and the utilization of these products are emerging technologies.[9]

Institute for a Sustainable Environment
5247 University of Oregon
Eugene, OR 97403-5247
T (541) 346-4545 **F** (541) 346-2040
ewp@uoregon.edu http://ewp.uoregon.edu

RESOURCE INNOVATIONS

Landscaping and Agricultural Uses

1. Compost - decomposed organic material created when organic wastes including wood chips are combined to speed up the breakdown of organic materials. Compost can be added to soil or used to grow plants.[10]

2. Landscaping mulch – Shredded, chipped, or ground bark, treetops, or limbs that is used as in gardening as well as for ornamental purposes and other landscaping purposes including trails and play areas.[11]

3. Animal Bedding – Wood shavings and sawdust that are used to provide bedding for livestock and help with the removal of manure from pens or stalls.[12]

Building Products

1. Roundwood Products – wood products that are in the original round form such as posts and poles and house logs.[13]

2. Solid wood products – products like moulding, wood flooring, cabinets, and windows that can be made from woody biomass.[14]

3. Engineered Wood Products – A variety of structural products made by assembling wood scraps and smaller pieces of wood including beams, boards, and I-joists.[15]

4. Wood Composites – Products like oriented-strand board (OSB), particle board, and medium density fiberboard (MDF) where smaller pieces of wood are reassembled using glue or residn and other products like composite decking where smaller pieces of wood are combined with plastic.[16]

Other Uses

1. Wood-based Chemicals – chemical products like cellulosic polymers, resin adhesives, glucose, and cleaning products that are extracted from wood through a variety of processes.[17]

2. Pulp and Paper – Pulp is a product that is derived from wood through complex chemical and/or mechanical manufacturing processes that is the major component in paper and paperboard products like newsprint, packaging, and tissues.[18]

Notes

[1] Dennis L. Lynch and Kurt H Mackes, *Opportunities for Making Wood Products from Small Diameter Trees in Colorado* (USDA Forest Service, 2002), http://www.fs.fed.us/rm/pubs/rmrs_rp037.pdf (accessed September 30, 2009).

[2] Bear Mountain Forest Products, "Bear Bricks", http://www.bmfp.com/bear-bricks/ (accessed September 30, 2009).

[3] Rural Voices for Conservation Coalition, *Woody Biomass Definition of Terms*, (Rural Voices for Conservation Coalition, 2008), http://www.sustainablenorthwest.org/resources/rvcc-issue-papers/Issue%20Paper%20-%20biomass08DEFSONLY.pdf, (accessed September 30, 2009).

[4] RVCC 2008

[5] RVCC 2008, and J.R. Shelly, *Woody Biomass Definitions and Conversion Factors,* (UC-Berkeley, 2007), http://groups.ucanr.org/Woody-Biomass/documents/InfoGuides12929.pdf (accessed September 30, 2009).

[6] International District Energy Association, "What is District Energy", http://www.districtenergy.org/what_is.htm (accessed September 30, 2009).

[7] Custom Charcoal, "Charcoal FAQs", http://www.customcharcoal.com/charcoal-faqs.html (accessed September 30, 2009).

[8] RVCC 2008

[9] Safar Salman, "Biomass Pyrolysis", AltEnergyMag, http://www.altenergymag.com/emagazine.php?issue_number=09.02.01&article=pyrolysis (accessed September 30, 2009), and Biomass Energy Foundation, "Biomass Gasification", http://www.woodgas.com/gasification.htm (accessed September 30, 2009).

[10] Environmental Protection Agency, "Composting", http://www.epa.gov/osw/conserve/rrr/composting/basic.htm (accessed September 30, 2009).

[11] Michigan State University Extension – Genesee Country, "Mulches in the Landscape", http://www.canr.msu.edu/genesee/hort/mulches.htm (accessed September 30, 2009), and USDA Forest Service 2002

[12] Clean Washington Center, *Wood Waste Quality Specification for Animal Bedding*, (Clean Washington Center, 1997), http://www.p2pays.org/ref/02/01103.pdf (accessed September 30, 2009), and USDA Forest Service 2002

[13] USDA Forest Service 2002, and UC-Berkeley 2007

[14] RVCC 2008

[15] ToolBase Services, "Engineered Wood Wall Framing", http://www.toolbase.org/Technology-Inventory/walls/engineered-wood-wall-framing (accessed September 30, 2009).

[16] RVCC 2008

[17] Irving S. Goldstein, "Outlook for the Future", (paper presented at the Eighth World Forestry Conference, Djarkata, October 1978), http://www.fao.org/docrep/n5525e/n5525e01.htm (accessed September 30, 2009).

[18] Pulp and Paper Products Council, "Product Definitions", http://www.pppc.org/en/1_0/index.html (accessed September 30, 2009).